CLAIMS

1. A metal component for fuel cell, to be disposed in contact with a main cell unit comprising a polymer electrolyte film and a pair of electrodes holding it in between,

configured as having a plate-formed metal base composed of a metal less noble than Au, and an Au film formed on the main surface thereof, having a cutting plane formed as an end face stretched up to said main surface, the cutting plane having a region of 1 mm or less in width having said metal base exposes therein.

2. A metal component for fuel cell, to be disposed in contact with a main cell unit comprising a polymer electrolyte film and a pair of electrodes holding it in between,

configured as having an Au film formed on the main surface of a plate-formed metal base composed of a metal less noble than Au, and said metal base being cut along a planned cutting line reflecting a contour of said component.

3. The metal component for fuel cell as claimed in Claim 1 or 2, wherein said electrode has a plate form and is in contact with said polymer electrolyte film on a first main surface thereof, and said metal component is composed as a separator disposed in contact with said electrode on a second main surface thereof, having a regular rough on the main surface opposing to said electrode, projected portions of said

regular rough being brought into contact with said electrode, and recessed portions of said regular rough serving as a gas flow path through which a fuel gas or an oxidizer gas is supplied to said electrode.

4. A metal component for fuel cell available as a separator disposed in contact with a second main surface of a plate-formed electrode which is disposed in contact with a polymer electrolyte film as an electrolyte on a first main surface thereof, having a regular rough on the main surface, opposing to said electrode, of a plate-formed metal base composed of a metal less noble than Au, top portions of projected portions of said regular rough being brought into contact with said electrode, and recessed portions of said regular rough serving as a gas flow path through which a fuel gas or an oxidizer gas is supplied to said electrode, wherein said metal base has an Au film of 1 to 500 nm thick formed on both of the tip surface of said projected portions brought into contact with said electrode, and the main surface region other than said tip surface.

5. The metal component for fuel cell as claimed in Claim 4, wherein said Au film has exposed regions of said base formed therein in a discrete manner.

6. The metal component for fuel cell as claimed in any one of Claims 1 to 5, wherein said metal base is composed of a material capable of producing at least an active potential range and a passive potential

range in an anode polarization curve measured in a sulfuric acid solution of pH1 at 80°C, and showing an anode current density of 100 μA/cm^2 or less in the passive potential region.

7. The metal component for fuel cell as claimed in Claim 6, wherein said metal base contains at least Cr.

8. The metal component for fuel cell as claimed in Claim 7, wherein said metal base is composed of an Fe-base alloy or an Ni-base alloy satisfying $W_{Cr} + 3.3W_{Mo} \geqq 10$, where W_{Cr} (% by weight) is content of Cr contained therein, and W_{Mo} (% by weight) is content of Mo.

9. The metal component for fuel cell as claimed in any one of Claims 1 to 8, being arranged in a sulfuric acid environment of pH1 to 6, during use of the fuel cell.

10. A fuel cell having a main cell unit which comprises a polymer electrolyte film and a pair of electrodes holding it in between, and the metal component for fuel cell as claimed in any one of Claims 1 to 9.

11. A method of manufacturing a metal component for fuel cell, to be disposed in contact with a main cell unit comprising a polymer electrolyte film and a pair of electrodes holding it in between, comprising the steps of:

forming an Au film on the surface of a plate-formed metal base

composed of a metal less noble than Au, and cutting the metal base along a planned cutting line reflecting a contour of said component.

12. An austenitic stainless steel for polymer electrolyte fuel cell, consisting essentially of, in % by weight (same will apply hereinafter), Cu: 0.10-6.00%, Ni:6.00-13.00%, Cr: 16.00-20.00%, N: 0.005-0.30%, Si: 1.00% or less, Mn: 1.00% or less, and the balance of Fe and inevitable impurities.

13. An austenitic stainless steel for polymer electrolyte fuel cell, consisting essentially of Cu: 0.10-6.00%, Ni:6.00-13.00%, Cr: 16.00-20.00%, Mo: 0.10-4.00%, N: 0.005-0.30%, Si: 1.00% or less, Mn: 1.00% or less, and the balance of Fe and inevitable impurities.

14. An austenitic stainless steel for polymer electrolyte fuel cell, consisting essentially of Cu: 0.10-6.00%, Ni:10.00-15.00%, Cr: 16.00-18.50%, Mo: 1.00-4.00%, N: 0.005-0.30%, Si: 1.00% or less, Mn: 1.00% or less, and the balance of Fe and inevitable impurities.

15. An austenitic stainless steel for polymer electrolyte fuel cell, consisting essentially of Cu: 0.10-6.00%, Ni:6.00-13.00%, Cr: 16.00-20.00% and N: 0.005-0.30%, and also of C: less than 0.02%, Si: 1.00% or less, Mn: 1.00% or less, P: 0.030% or less and S: 0.005% or less, satisfying a relation of $250 \times [C\%]+5 \times [Mn\%]+25 \times [P\%]+200 \times [S\%]<10$, and the balance of Fe and inevitable impurities.

16. An austenitic stainless steel for polymer electrolyte fuel cell, consisting essentially of Cu: 0.10-6.00%, Ni:6.00-13.00%, Cr: 16.00-20.00%, Mo: 0.10-4.00% and N: 0.005-0.30%, and also of C: less than 0.02%, Si: 1.00% or less, Mn: 1.00% or less, P: 0.030% or less and S: 0.005% or less, satisfying a relation of $250\times[C\%]+5\times[Mn\%]+25\times[P\%]+200\times[S\%]<10$, and the balance of Fe and inevitable impurities.

17. An austenitic stainless steel for polymer electrolyte fuel cell, consisting essentially of Cu: 0.10-6.00%, Ni:10.00-15.00%, Cr: 16.00-18.50%, Mo: 1.00-4.00% and N: 0.005-0.30%, and also of C: less than 0.02%, Si: 1.00% or less, Mn: 1.00% or less, P: 0.030% or less and S: 0.005% or less, satisfying a relation of $250\times[C\%]+5\times[Mn\%]+25\times[P\%]+200\times[S\%]<10$, and the balance of Fe and inevitable impurities.

18. The austenitic stainless steel for polymer electrolyte fuel cell as claimed in any one of Claims 12 to 17, containing, in place of a part of Fe in the austenitic stainless steel for polymer electrolyte fuel cell, either one or both of Ti and Nb respectively in an amount of 1.20% or less and $5\times[C\%]$ or more.

19. A metal component for fuel cell configured using the austenitic stainless steel for polymer-type electrolyte fuel cell as claimed in any one of Claims 12 to 18, and disposed in contact with a main cell unit comprising a polymer electrolyte film as an electrolyte and a pair of

electrodes holding it in between.

20. The metal component for fuel cell as claimed in Claim 19, wherein said electrode has a plate form and is in contact with said polymer electrolyte film on a first main surface thereof, and said metal component is composed as a separator disposed in contact with said electrode on a second main surface thereof, having a regular rough on the main surface opposing to said electrode, projected portions of said regular rough being brought into contact with said electrode, and recessed portions of said regular rough serving as a gas flow path through which a fuel gas or an oxidizer gas is supplied to said electrode.

21. A fuel cell having a main cell unit which comprises a polymer electrolyte film as an electrolyte and a pair of electrodes holding it in between, and the metal component for fuel cell as claimed in Claims 19 or 20.

22. A polymer electrolyte fuel cell material comprising a plate material composed of an Fe-base alloy, Ni-base alloy, Ti or Ti-base alloy, and a cover film of a noble metal covering the surface thereof, wherein the cover film on the plate material has a surface roughness as expressed in R_{max} of 1.5 μm or less.

23. The polymer electrolyte fuel cell material as claimed in Claim 22, wherein said cell material shows, in a metal ion release test, an amount

of Fe ion elution of 0.15 mg/0.4 liter or less, and an amount of Ni ion elution of 0.01 mg/0.4 liter or less.

24. A method of manufacturing a polymer electrolyte fuel cell material comprising:

a coverage step of forming a cover film of a noble metal so as to cover the surface of a plate material composed of an Fe-base alloy, Ni-base alloy, Ti or Ti-base alloy; and

a rolling step of rolling said plate material having the surface covered with said cover film of a noble metal, between a pair of rolls having a surface roughness as expressed in R_{max} of 1.5 μm or less.

25. The method of manufacturing a polymer electrolyte fuel cell material as claimed in Claim 24, wherein in said rolling step, the rolling is carried out under a draft of 1% or more.

26. A method of manufacturing a polymer electrolyte fuel cell material comprising:

a smoothening step of smoothening a plate material composed of an Fe-base alloy, Ni-base alloy, Ti or Ti-base alloy so as to attain a surface roughness as expressed in R_{max} of 1.5 μm or less; and

a coverage step of forming a cover film of a noble metal so as to cover the surface of said plate material.

27. A metal component for fuel cell configured by using the polymer

electrolyte fuel cell material as claimed in Claim 22 or 23, and to be disposed in contact with a main cell unit comprising a polymer electrolyte film as an electrolyte and a pair of electrodes holding it in between.

28. The metal component for fuel cell as claimed in Claim 27, wherein said electrode has a plate form and is in contact with said polymer electrolyte film on a first main surface thereof, and said metal component is composed as a separator disposed in contact with said electrode on a second main surface thereof, having a regular rough on the main surface opposing to said electrode, projected portions of said regular rough being brought into contact with said electrode, and recessed portions of said regular rough serving as a gas flow path through which a fuel gas or an oxidizer gas is supplied to said electrode.

29. A fuel cell having a main cell unit which comprises a polymer electrolyte film as an electrolyte and a pair of electrodes holding it in between, and the metal component for fuel cell as claimed in Claim 27 or 28.

30. A corrosion-resistant conductive component comprising a metal base and a noble metal film of 100 nm thick or less formed on at least a part of the surface of said metal component, said noble metal layer and an intermediate layer formed between said base and said noble metal layer having impurity contents of C: 1.5% or less, P: 1.5% or less, O:

1.5% or less and S: 1.5% or less, and being restricted to C+P+O+S: 4.0% or less.

31. The corrosion-resistant conductive component as claimed in Claim 28, wherein said metal base is a stainless steel.

32. The corrosion-resistant conductive component as claimed in Claim 31, wherein said stainless steel is an austenitic stainless steel.

33. The corrosion-resistant conductive component as claimed in Claim 32, wherein said noble metal layer and said intermediate layer have a maximum Cr/Fe ratio of 3 or less, and a maximum Ni/Fe ratio of 2 or less.

34. The corrosion-resistant conductive material as claimed in Claim 30, wherein a noble metal composing said noble metal film is any one element selected from Au, Pt, Pd, Rh and Ru, mixtures of these elements, and alloys mainly composed of these elements.

35. A method of manufacturing a material having a noble metal film formed on at least a part of the surface of metal base, comprising the steps of removing a contamination film which resides on the surface of said metal base by a physical and/or chemical procedure so as to allow a clean surface to expose, and forming thereon a cover film of a noble metal immediately thereafter, before said surface is contaminated again.

36. The corrosion-resistant conductive component as claimed in any one of Claims 30 to 34, being configured as a metal separator for fuel cell.

37. A fuel cell having a main cell unit which comprises a polymer electrolyte film and a pair of electrodes holding it in between, and the metal separator for fuel cell as claimed in Claim 36.